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山东五图早始新世更猴科(Plesiadapidae, Mammalia)化石[1)]

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摘要　记述了山东五图盆地早始新世五图组的一种更猴类(plesiadapid)化石:杨氏亚洲更猴(*Asioplesiadapis youngi* gen. et sp. nov.)。在它增大的下门齿上具有更猴科特有的下缘尖和下缘脊,但其下颊齿性状相当原始,p4 跟座呈盆状,m3 下次小尖呈锥状更类似白垩纪晚期出现的更猴形动物 *Purgatorius*。*Asioplesiadapis* 的下臼齿形态可以说明亚洲更猴类虽然有北美和欧洲更猴的某些典型特征,但并不在同一进化支系。因此,另立一新亚科——亚洲更猴亚科(Asioplesiadapinae subf. nov.)。

关键词　山东五图,早始新世,更猴类

中图法分类号　Q915.879

自 1961 年杨钟健教授记述山东昌乐五图煤矿发现的五图昌乐蜥(*Changlosaurus wutuensis*)后,最早的早始新世哺乳动物是有关始祖貘(*Homogalax wutuensis*)的报道(Chow and Li, 1963, 1965),化石采自五图镇老旺沟。1981 年,中国地质科学院的李云通在同一地点采到哺乳类化石——异冠齿兽(*Heterocoryphodon* sp.)。而后童永生和王景文等对五图动物群做了更多的野外和室内工作,逐渐揭示了多种多样的五图动物群。到目前为止,五图动物群至少包括多瘤齿兽目(Multituberculata)、古乏齿亚目(Palaeanodonta)、食虫目(Insectivora)、更猴形亚目(Plesiadapiformes)、啮齿目(Rodentia)、踝节目(Condylarthra)和奇蹄目(Perissodactyla)等 10 多个目,30 余种哺乳动物(Tong and Wang, 1998)。

更猴形亚目(Suborder Plesiadapiformes)是一类形似灵长类的古老的哺乳动物,最初出现于白垩纪晚期,绝灭于始新世中期。由于其颊齿形态类似灵长类,所以一直归入灵长目。但近年怀疑这类哺乳动物与灵长目之间无直接的亲缘关系,因而有人提出另立新目——Proprimates (Gingerich, 1989),也有人根据一些肢骨标本,认为这类动物可归入皮翼目(Dermoptera) (Beard, 1993)。不论将更猴形类另立新目,或是归入其他目,目前都缺少有力的证据。因而,这里更猴形亚目仍寄放在灵长目。1990 年童永生与王景文在五图组煤层中找到了这类动物的踪迹,其中食果猴类(carpolestids)已做了报道(Beard and Wang, 1995)。1996 年首次于五图发现了更猴科的标本,这也是第一次在亚洲发现此类动物,它为研究北美与亚洲老第三纪动物交流提供了新的证据。

五图更猴的研究原为傅静芳的硕士论文,现由王景文和童永生修改、补充成文。文中牙齿构造名称依据周明镇等(1975)和 Gingerich (1976)的命名建议,牙齿测量部分依据

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Gingerich (1976) ,系统分类依 Gunnell (1989) 。

?灵长目　?Primates Linnaeus, 1758

更猴形亚目　Plesiadapiformes Simons et Tattersall, 1972

更猴科　Plesiadapidae Trouessart, 1897

亚洲更猴亚科(新亚科)　Asioplesiadapinae subf. nov.

模式属　*Asioplesiadapis* gen. nov. 。

特征　同属。

讨论　先后归入更猴科的属有 *Pronothoectes*、*Nannodectes*、*Chiromyoides*、*Plesiadapis*、*Platychoerops*、*Saxonella* 和 *Pandemonium*。其中, *Saxonella* 最早发现在欧洲,做为独立的亚科归入食果猴科(Carpolestidae) (Russell, 1964) ,后有人将其归入更猴科(Van Valen, 1969) 。*Saxonella* 的 p3 和 p4 已特化成斜脊齿兽状牙齿(plagiaulacoid teeth) ,与 plesiadapids 相差较大,常自成一科(Rose, 1975 等)。这里认为 Rose 等的归类较好。Puercan 晚期的 *Pandemonium* 被排除出更猴科(Silcox et al., 2001) ,但 *Pandemonium* 与典型的更猴类的相似性说明 Puercan 属与更猴类有密切的亲缘关系。这里记述的五图更猴标本与典型的北美和欧洲更猴类的明显区别在于五图种 p4 下臼齿的齿尖比较尖锐,三角座轻微前后收缩,相对直立和 m3 下次小尖叶不增大、增宽。

亚洲更猴(新属) Asioplesiadapis gen. nov.

模式种　杨氏亚洲更猴(新属、新种) *Asioplesiadapis youngi* gen. et sp. nov. 。

特征　个体小,下齿列齿式为 1.0.3.3。下门齿呈矛状,粗壮,长且匍匐,具有明显的下缘尖(margoconid)和下缘脊(margocristid) 。p4 三角座仅有一粗壮的下原尖,斜脊清楚,下次尖强,下内尖弱,跟盆浅。m1-3 三角座前后轻微收缩,三角座与跟座接近等宽,但高于跟座。m1-3 下前尖小而低,与下后尖分离,下原尖与下后尖之间有一深的"V"形谷相隔;下次中凹较浅,下中尖弱;在 m1-2,下次小尖很弱;m3 跟座无裂沟,无细褶皱,向后收缩,下次小尖呈锥状,向后突出,形成不大的下次小尖叶。

属名由来　因亚洲首次发现更猴科的动物,以亚洲"*Asio-*"为前缀,加上更猴属名"*plesiadapis* 为名。

杨氏亚洲更猴(新属、新种) Asioplesiadapis youngi gen. et sp. nov.

(图 1)

正模　右下颌骨水平支,保存完整的 i1 和 p4～m3,以及 p4 和 i1 之间的 3 个齿槽(中国科学院古脊椎动物与古人类研究所编号:IVPP V 10708) 。

特征　同属的特征。

种名由来　种名送给已故的杨钟健教授。1961 年,杨先生首先记录了五图组发现的脊椎动物化石 ——五图昌乐蜥(*Changlosaurus wutuensis*) 。

地点与层位　山东昌乐县五图煤矿,五图组,始新世早期。

描述　右下颌骨的上升支破损,只留下不完全的水平支。水平支较深(在 m1 处高 5.49mm) ,前后接近等高。下齿列齿式为 1.0.3.3。颊齿稍狭长。

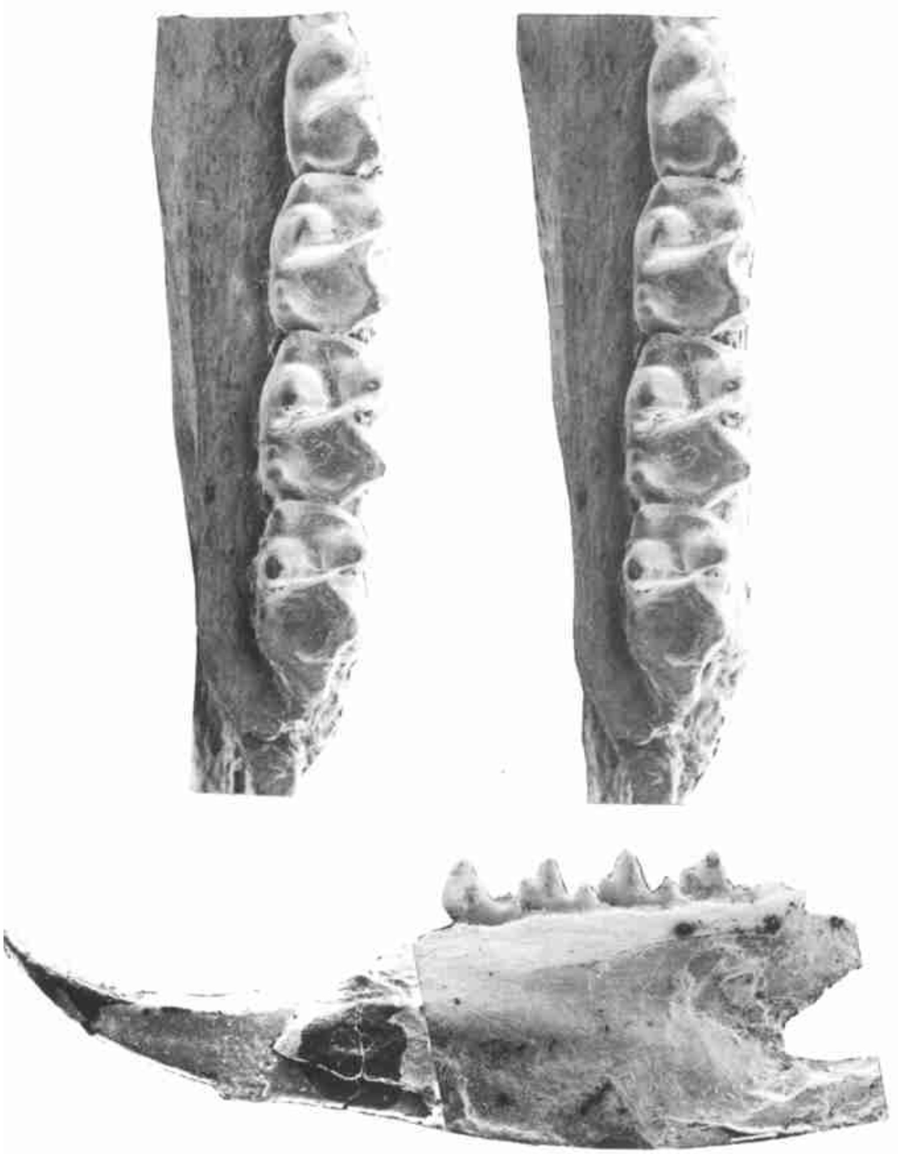


图 1　杨氏亚洲更猴(新属、新种)右下颌骨(IVPP V 10708)
冠面视(上 ,立体照) , ×10 和舌侧视(下) , ×6

Fig. 1　Right mandible of *Asioplesiadapis youngi* gen. et sp. nov.
p4～m3 , occlusal view (above , stereophotographs) , ×10 and
right mandible , lingual view (below) , ×6

在下颌骨标本上 ,i1 和 p4 之间有 3 个齿槽。从所有的更猴形亚目动物来看 ,除了 *Purgatorius* 存有 p1 外 ,其余的 p1 几乎都已退化 ,但大多保留 p2～p4。在更猴科的已有种类中 ,p3 皆为双根 ,进步种类前臼齿趋于退化 ,犬齿和 i2 大都退化 ,所以推测五图标本的下齿列齿式也为 1-0-3-3。

i1 : 下门齿长 ,向前匍匐 ,粗壮 ,冠面视宽 ,前端翘起 ,呈矛状。从牙齿基部到顶端 ,牙齿渐渐稍向舌侧倾斜。在下门齿基部 ,具有明显的下缘尖 ,位于背面正中 ,其尖端向前。il 具有 4 条伸向牙齿顶端的棱脊 :背侧面除舌侧棱和唇侧棱外 ,还有下缘脊 ,腹侧面和舌侧面相交处还有一条棱脊伸向牙齿顶端。除此 4 条棱脊外 ,i1 齿面光滑。

p2 : 单根齿。齿槽很小 ,这颗牙齿应比较退化。

p3 : 双根齿。从齿槽判断 ,大小似与 p4 相近。

p4 : 臼齿化程度较高 ,但不如这一科中最进步的 *Platychoerops*。p4 前窄后宽。三角座明显高于跟座 ,但长度相当。三角座上只有一个非常粗壮的锥状下原尖。跟座上具有下次尖与下内尖 ,下内尖弱但仍清晰可辨。下次尖发育 ,斜脊向前偏内方延伸 ,跟盆浅。舌侧有极微弱齿带。

下臼齿三角座前后轻微收缩 ,且不向前倾斜。齿带无 ,齿尖锐利。

m1 : 呈长方形 ,三角座显著高于跟座 ,长度略小于跟座 ,但二者近于等宽 ;下前尖位于舌侧 ,小且低 ,在下后尖前方。下原尖与下后尖之间有一深的“V ”形谷。下后尖比下原尖更为粗壮。下前脊和下原脊细弱。斜脊与下次尖后棱较发育。斜脊从粗壮的下次尖伸向下原尖后壁 ,在下内尖基部有小且清晰的下内小尖。跟盆较浅 ,无下中尖 ,下次小尖非常微弱。下次中凹较浅。

m2 : 呈长方形 ,比 m1 稍大 ,但二者很相似。m2 三角座较高 ,下前脊细 ,下原脊较 m1 发育 ,具下中尖 ,但较弱。

m3 : 比 m1、m2 延长 ,但相对较窄。三角座形态几与 m1 和 m2 相同 ,但下前尖、下原尖、下后尖都要比 m1 稍小。下前脊仅比 m1 发育 ,下原脊如同 m2。下次小尖呈锥状 ,比下次尖略大 ,向后突出 ,形成不大的下次小尖叶 ,跟座向后收缩。下中尖小 ,斜脊与下原脊中部相连 ,跟盆浅 ,侧向压缩。无下内尖 ,跟盆向舌面开口。跟盆釉质层光滑 ,无裂沟 ,无细褶皱。

比较和讨论 更猴形亚目(Plesiadapiformes)共包括大约 30 属 ,绝大多数的材料是上、下牙齿或齿列 ,它们以第一下门齿增大、前臼齿常特化、犬齿退化或无、臼前齿齿式趋于减少、臼齿低冠、上臼齿三角座及下臼齿下跟座增大、m3 下次小尖向后突出为特征(Bown , and Rose , 1976 ; Rose , et al. , 1994) 。五图标本具有增大的 i1、无犬齿、下前臼齿数目退化到 3 个、下臼齿跟座较大、m3 下次小尖向后突出 ,可归入更猴形亚目。

表 1 杨氏亚洲更猴(新属、新种)右下颊齿测量

Table 1 Measurements of right lower cheek teeth of *Asioplesiadapis youngi* **gen. et sp. nov.** (mm)

	i1	p4	m1	m2	m3
L(齿长)	6.51[1)]	1.63	1.71	1.75	2.01
TrW(三角座宽)	1.87	0.90	1.32	1.39	1.14
TaW(跟座宽)		1.08	1.32	1.38	1.12

1) i1 长度从齿尖端至下缘尖后缘 ,i1 高(incisor depth) : 2.10mm。

更猴形亚目曾先后包括 Purgatoriidae、Palaechthonidae、Microsyopidae、Paromomyidae、Plesiadapidae、Carpolestidae、Picrodontidae 和 Saxonellidae 等。其中五图标本因无异常增大的 m1 和没有布满乳头状突起的下臼齿可与 Picrodontidae 相区别 ;p4 未增大 ,未形成斜沟齿兽状脊(plagiaulacoid blade)可与 Carpolestidae 相区别 ;i1 呈矛状 ,p3 不增大 ,p4 未呈斜沟齿

兽状脊等特征可与 Saxonellidae 区别;m2-3 皆具下前尖,具有矛状的 i1 而与 Paromomyidae 相区别;没有像 Microsyopidae 那样增大的 p4;臼前齿退化而与 Purgatoriidae 相区别;并以其具下缘脊与下缘尖的 i1 而与 Palaechthonidae 相区别。

具下缘脊与下缘尖的 i1 正是更猴科和其他更猴形类区分的典型特征,五图标本不仅具有典型的更猴类的下门齿冠面构造,其下臼前齿形态也与更猴科相近。五图标本的 i1 很粗壮,牙冠上共有 4 条脊,在更猴形亚目中只有更猴科在相应位置上有脊,虽然有时数目不同;更猴科的 i1 都很粗壮,有 4 属的 i1 呈凿状,但最进步的一属 *Platychoerops* 的 i1 呈矛状,形态和五图标本相同。更猴科中大部分种类的 p4 跟座收缩,未形成跟盆,不过 *Nannodectes gidleyi* 与 *Platychoerops* 的 p4 和五图标本有些类似,皆有跟盆的存在。据此,笔者将五图标本归入更猴科,但也带有一些不确定性。

通常更猴科包括 5 属: *Pronothoectes*、*Nannodectes*、*Chiromyoides*、*Plesiadapis* 和 *Platychoerops*,但是五图标本与这些典型的更猴类是有较大差异的。五图种的个体要比已知的更猴类小。虽然五图标本的臼前齿和臼齿形态可与更猴科对比,但与这些已知属的区别很明显:1) 已知属的下臼齿下前尖稍向舌侧位移,下前尖在下后尖基部稍高处与下后尖连生,所以两尖相距很近,并且两尖等高或下前尖稍低一点,但是五图标本的下前尖相对唇位,与下后尖分得较开,且比下后尖低得多;2) 五图标本下臼齿的三角座与跟座近于等宽,两者之间高差相对较大,而已知属的下臼齿跟座都较宽大,且两者高差较小;3) m3 的形态变化是已知的更猴类演化中的一个很重要的方面(Gingerich, 1976, p. 71),如已知的更猴类 m3 的跟盆釉质层从光滑到有轻微细褶皱至布满褶皱(crenulate enamel),从无裂沟到出现裂沟,又如下次小尖叶后端均上翘,而且下次小尖叶后端趋于增大、增宽。与已知属不同的是,五图标本的 m3 跟盆及下次小尖叶釉质光滑,下次小尖叶后端收缩,既无裂沟也不上翘。相对来说,五图种的 m3 形态与北美古新世中期(To3) 的 *Pronothodectes* 较为相近,但 *Pronothodectes* 的下次小尖叶显然也比五图属宽且上翘;4) 这些已知属的下臼齿三角座前后收缩,明显向前倾斜,而五图标本的三角座前后轻微收缩,齿尖几近直立;5) 已知属的下臼齿齿尖相对圆钝,基部膨大,而五图标本的齿尖锐利,基部不膨胀;6) 这些已知属齿带发育,五图标本齿带则弱。

Van Valen (1994) 记述了 Puercan 晚期的 *Pandemonium dis*,并将其归入更猴科。相对来说,五图种的下臼齿形态与 Puercan 种比较接近,两者的三角座都不如其他 5 个属那样明显前后收缩,m3 下次小尖叶不大,而五图标本与 *Pandemonium dis* 的区别也很明显:p4 长大于宽,无下次小尖,跟座呈盆状,下臼齿延长,三角座前后不大收缩和齿尖比较尖锐。如上所述,五图标本与更猴科已知属的区别是显而易见的,所以建立新属:*Asioplesiadapis*。

从五图标本的下齿式(1-0-3-3) 来看,它应是更猴科中比较进步的种类。在更猴科中,下齿式逐步退化,由 2,1,3,3 退化成 1,0,3,3 进一步退化成 1,0,2,3。五图种的下齿式比已知属种中的进步属种(如 *Plesiadapis tricuspidens* 和 *Platychoerops* 等,下齿列齿式为 1-0-2-3) 原始,而比原始的属种(如 *Pronothodectes* 等下齿式为 2-1-3-3) 进步。最近,Silcox 等(2001) 在做更猴形类的特征分析时指出一些颊齿性状的原始和进步特点。对照 Silcox 等的分析,可以看出 *Asioplesiadapis* 的下臼齿形态似比 Torrejonian 期出现的 *Pronothodectes* 更为原始,保留了许多更猴形亚目最古老的类型 *Purgatorius* (Van Valen and Sloan, 1965; Clemens, 1975; Van Valen, 1994; Buckley, 1997) 的特征(表 2),主要表现在下臼齿的齿尖

比较尖锐,三角座前后不大收缩,下原尖和下后尖之间有“V”形谷,下前尖相对远离下后尖,三角座和跟座近于等宽,以及 m3 下次小尖呈锥状,向后突出,形成不大的下次小尖叶,后端收缩。这还表现在 p4 上,*Asioplesiadapis* 的 p4 有向前内方延伸的斜脊,与下次尖后棱一起形成跟盆。北美的 *Pronothodectes*、*Nannodectes*、*Chiromyoides*、*Plesiadapis* 和 *Platychoerops* 组成一单系群(monophyletic group),进化趋势也比较明显:个体增大,齿式退化,上门齿的一些小尖逐步消失,p4 相对臼齿化,m3 釉质层起皱,下次小尖叶逐步成方形,出现裂沟(Gingerich, 1976)。而五图种虽然出现的时代较晚,但个体小,m3 釉质层光滑,下次小尖叶小,无裂沟,也不成方形。因此,五图种似乎是代表了与北美更猴类平行发展的一相对保守的支系。因此,建立新亚科:Asioplesiadapinae。

表 2 Asioplesiadapis **与** Purgatorius **和** Pronothodectes **牙齿特征比较**

Table 2 Comparative dental characters of Asioplesiadapis, Purgatorius **and** Pronothodectes

	Purgatorius	*Pronothodectes*	*Asioplesiadapis*
下齿列齿式 (lower dental formula)	3-1-4-3	2-1-3-3	1-0-3-3
i1	?	具下缘脊及下缘尖(with margoconid and margocristid)	具下缘脊及下缘尖(with margoconid and margocristid)
p4 三角座 (trigonid of p4)	有下原尖及下前尖 (protoconid and paraconid present)	只有下原尖,粗壮 (only robust protoconid present)	只有下原尖,粗壮 (only robust protoconid present)
p4 跟座(talonid)	较发育,具跟盆,下次尖弱 (basined, developed talonid, with weak hypoconid)	无跟盆,下次尖偏弱 (unbasined talonid with less developed hypoconid)	较发育,具跟盆,下次尖粗壮 (basined, developed talonid with strong hypoconid)
下臼齿下中尖 (lower molar mesoconid)	无 (absent)	弱 (weak)	弱 (weak)
下臼齿下前尖 (lower molar paraconid)	发育 (developed)	小 (small)	小 (small)
下臼齿三角座 (molar trigonid)	前后不大收缩,轻微前倾 (less compressed, slightly inclined forward)	前后收缩明显,显著前倾 (distinctly compressed, clearly inclined forward)	前后收缩不大,微微前倾 (less compressed, slightly inclined forward)
下臼齿三角座与跟座的宽度 (relative widths of trigonid and talonid)	三角座与跟座近于等宽 (talonid subequal to trigonid in width)	跟座比三角座宽 (talonid wider than trigonid)	三角座与跟座近于等宽 (talonid subequal to trigonid in width)
下臼齿下前尖与下后尖 (molar paraconid position relative to metaconid)	分开 (paraconid apart from metaconid)	下前尖靠近下后尖基部 (paraconid close to the base of metaconid)	分开 (paraconid apart from metaconid)
m1-2 下次小尖 (hypoconulid of m1～2)	很弱 (very weak)	小,但清晰 (small but clear)	很弱 (very weak)
m3 跟盆和下次小尖叶 (m3 talonid basin and hypoconulid lobe)	跟盆的釉质层光滑,下次小尖叶后端收缩(enamel smooth, hypoconulid lobe narrowed posteriorly)	釉质层较为光滑,下次小尖叶后端增大、增宽 (enamel less smooth, hypoconulid lobe enlarged and widening)	跟盆釉质层光滑,下次小尖叶后端收缩 (enamel smooth, hypoconulid lobe narrowed posteriorly)
齿带(cingulum)	弱(weak)	强(relatively strong)	弱(weak)

Van Valen (1994) 认为 *Pandemonium* 填补了 *Purgatorius* 和更猴类基部的 *Pronothodectes*

之间的间隙。Puercan 晚期的 *Pandemonium dis* ,上面已提到 , Puercan 种与五图种一样 ,m3 釉质层光滑 ,下次小尖小 ,也无裂沟 ,下次小尖叶向后收缩。但从 *Pandemonium dis* 的 p4 跟座横宽和斜脊短弱来看 , *Pandemonium* 似乎更接近北美和欧洲的更猴类。

Asioplesiadapis 和欧美已知的更猴类存在共同的近裔性状(synapomorphic character) ,如齿式退化 ,矛状的 i1 具有下缘尖和下缘脊 ,p4 三角座只有一个齿尖 ,显示出 *Asioplesiadapis* 与 *Pandemonium* 和 *Pronothodectes* 等可能会有最近的共同祖先。然而 ,在亚洲古新统中尚未发现确定的更猴形类化石。虽然有人怀疑安徽古新统中的某些种类是更猴形类(童永生 ,1979 ; Szalay and Li , 1986) ,但材料不足 ,难以肯定。而五图的 *Asioplesiadapis* 和食果猴类(carpolestids) (Beard and Wang , 1995) 的发现 ,证明了亚洲古新世更猴形类很可能存在。*Asioplesiadapis* 的发现 ,也和 *Chronolestes* 一样 ,表明亚洲更猴形动物存在不同于北美和欧洲的更猴类和食果猴类的演化方向发展的支系。

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THE NEW DISCOVERY OF THE PLESIADAPIFORMES FROM THE EARLY EOCENE OF WUTU BASIN, SHANDONG PROVINCE

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Key words　Wutu , Shandong , Early Eocene , Plesiadapiformes

Summary

Since 1990 , several plesiadapiforms have been found from the coal beds of the Wutu Coal Mine of Changle County , Shandong Province. *Chronolestes simul* and *Carpocristes oriens* , allocated to the family Carpolestidae were described by Beard and Wang (1995). In this paper , a new plesiadapiform , *Asioplesiadapis youngi* , is reported , and is referred to the family Plesiadapidae , based on its long , robust procumbent lower incisor , with margoconid and margocristid , and on dental morpho-logy.

Order ?Primates Linnaeus ,1758
Suborder Plesiadapiformes Simons et Tattersall ,1972
Family Plesiadapidae Trouessart ,1897
Subfamily Asioplesiadapinae subf. nov.

Type Genus　*Asioplesiadapis* gen. nov.
Diagnosis　As for the genus.

Asioplesiadapis **gen. nov.**

Type species　*Asioplesiadapis youngi* gen. et sp. nov.

Diagnosis A small-sized plesiadapid, with lower dental formula 1. 0. 3. 3. Lower incisor lanceolate, with distinct margoconid and margocristid; p2 single-rooted; p3 double-rooted, p4 trigonid only with a conical protoconid, talonid basined with distinct cristid obliqua and weak entoconid; lower molar trigonids less compressed anteroposteriorly, paraconid reduced and well separated from metaconid; a deep notch present between protoconid and metaconid; hypoflexid shallow, and mesoconid weak; m3 talonid unfissured, no crenulated enamel and shrinking posteriorly; hypoconulid conical, projecting posteriorly and forming an incipient hypoconulid lobe.

Etymology *Asio-* for its occurrence and *plesiadapis*, a frequent genus in the Plesiadapidae.

Distribution Eastern China, Early Eocene.

Asioplesiadapis youngi **gen. et sp. nov.**

(Fig. 1)

Holotype Right mandible with i1, p4～m3 and three alveoli for p2 and p3 (IVPP V 10708).

Diagnosis As for the genus.

Etymology *youngi*, in honor of late Prof. Young Chungchien, who first described a vertebrate fossil from the Early Eocene of Wutu Basin, *Changlosaurus wutuensis*, in 1961.

Locality and horizon Wutu Coal Mine of Changle County, Shandong Province; Early Eocene, Wutu Formation.

Remarks The suborder Plesiadapiformes usually includes Purgatoriidae, Palaechthonidae, Microsyopidae, Paromomyidae, Plesiadapidae, Carpolestidae, Saxonellidae, and Picrodontidae. The Wutu specimen differs from the Picrodontidae in lacking unusually enlarged m1 and lower molars with papillated enamel; differs from the Carpolestidae in lacking plagiaulacoid blade of p4; differs from the Microsyopidae in having simple trigonid of p4; differs from the Paromomyidae in having robust lower incisor with marked margoconid; differs from the Saxonellidae in lacking a p3 trenchant, plagiaulacoid blade, and enlarged than p4; differs from the Purgatoriidae in having reduced lower formula; and differs from Palaechthonidae in having lanceolate lower incisor with margoconid and margocristid. In fact, this special incisor of the Wutu specimen owned by the Plesiadapidae can be distinguished from other families of the suborder Plesiadapiformes. Due to this character, the Wutu specimen is placed in the family Plesiadapidae, but this assignment may not be appropriate.

The family Plesiadapidae usually includes five genera: *Pronothoectes*, *Nannodectes*, *Chiromyoides*, *Plesiadapis*, and *Platychoerops*. Compared with these known genera, the new species, *Asioplesiadapis youngi*, is distinctly smaller than the smallest taxon of the known plesiadapids, *Pronothodectes matthewi*. Although its lower dentition is comparable to the known plesiadapids in general dental morphology, the Wutu species is distinctly different from all definite plesiadapids: 1) molar trigonid is less compressed anteroposteriorly than that of the known plesiadapids; 2) paraconid is small and well separated from the metaconid on the lower molars of the Wutu species, but relatively large and close to the metaconid in the known species; 3) in the North American and European plesiadapids, the hypoconulid lobe (third lobe) of m3 is round and unfissured in the primitive species (for example, *Pronothodectes matthewi*), and in the derived species it "becomes more squared, and distinct posterior and medial fissures divide the heel" (Gingerich, 1976). Whereas the m3 hypoconulid is conical, and the talonid shrinks posteriorly in the new species; 4) cusps are relatively blunt on lower molars of the known plesiadapids, but are relatively sharper in the new specimen; 5) the basined talonid of p4 in the Wutu mandible is distinct from unbasined talonid of the known species. The Wutu specimen is also different from the late Puercan *Pandemonium*, referred to the Plesiadapidae by Van Valen (1994), in having elongated p4, with basined talonid and no hypoconulid, and in having elongated lower molars with relatively sharp cusps and less compressed trigonid. These differences seem to be important enough

to separate the Wutu specimen generically from the known plesiadapids.

Though the new genus, *Asioplesiadapis*, shares some derived features with more advanced plesiadapids, for example, reduced lower dental formula and enlarged i1 with margoconid and marcocristid, it has more primitive lower cheek teeth than those of the definite plesiadapids. The primitive features mainly are relatively sharper main cusps on the lower molars, less anteroposteriorly compressed trigonid, paraconid apart from the metaconid, presence of V-shaped notch between the protoconid and metaconid, and simple talonid and conical hypoconulid on m3. The presence of cristid obliqua and basined talonid on p4 seem to be primitive feature. These features usually occur in the early plesiadapiforms, *Purgatorius* and *Pandemonium*, but not in the known plesiadapids.

The earlier plesiadapid, *Pronothodectes matthewi*, made its first appearance in the Torrejonian age (To3), and the later plesiadapids of North America and Europe are derived from the Torrejonian genus (Gingerich, 1976). And the discovery of *Pandemonium* seems to bridge the gap between the *Purgatorius* and basal plesiadapid *Pronothodectes* (Van Valen, 1994). Because of the presence of some primitive features, the Asian genus, *Asioplesiadapis*, is not a direct descendant of *Pandemonium* or *Pronothodectes*, and may represent an Asian evolutionary lineage independent of North American and European plesiadapids.

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